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A SURVEY OF TRUMPETER SWANS IN ALBERTA, SASKATCHEWAN AND NORTHWEST TERRITORIES: 1990

Leonard J. Shandruk

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ABSTRACT

Trumpeter Swan flock surveys were conducted in Alberta, Southwestern Saskatchewan, and the Southern Mackenzie District of the Northwest Territories between July 2 and September 5, 1990. These surveys were a cooperative effort of Canadian Parks Service, Alberta Fish and Wildlife Division, Saskatchewan Parks and Renewable Resources and Canadian Wildlife Service. The objectives of these surveys were: to determine distribution and location of breeding habitat, to record all wetlands used by Trumpeter Swans, and to determine total population size of flocks surveyed.

Aerial surveys in Alberta, were flown with a Cessna 185 and 206 fixed-wing aircraft, while in the NWT both a fixed-wing and helicopter were utilized. The survey crew consisted of a pilot, an observer-navigator and on most occasions, a second observer.

The 1990 surveys accounted for 143 pairs of Trumpeter Swans, 148 flocked or single birds and 225 cygnets for a total of 659 birds within the areas surveyed. This is an increase of 253 swans (62%) from similar areas surveyed in 1985. The Grande Prairie, Alberta component of the flock accounted for 321 (49%) of the total count because this flock only increased by 36 birds from the 1985 census.

To determine the population health and status of the Interior Canada subpopulations, an annual fall survey of the Grande Prairie flock including the British Columbia portion of the flock is required. In addition, documentation of the total Canadian breeding range and the wintering grounds of these breeders is recommended in order to formulate long-term population and habitat strategies.

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1.0 INTRODUCTION

During the last 90 years Trumpeter Swans breeding in Canada have made a dramatic comeback. From a small remnant flock of less than 100 swans there are presently over 2000 breeding in Canada. Although the proportion of Trumpeter Swans known to breed in Canada is still small (10%) relative to the total North American population, and breeding flocks are limited to a small portion of western Canada, it is now classified as a vulnerable migratory bird by the Committe on the Status of Endangered Wildlife in Canada (COSEWIC) 1990. The Migratory Birds Convention Act provides legislation and encourages management activities to ensure maintenance and preservation of Trumpeter Swan populations and habitat. This would involve the complete documentation and protection of breeding habitats in Canada and cooperative efforts with the United States to improve and enlarge the wintering habitats in North America.

Traditionally, it was believed that breeding habitat limited the Interior Canada subpopulation (Mackay 1978). Increases in the number of pioneering flocks in Canada, continuous growth of the Grande Prairie, Fort Nelson, Toobally Lakes and Southern Mackenzie flocks and recent winter die-offs in the Tri-state region provide strong evidence that wintering habitat is the critical factor limiting population growth. Nevertheless, as part of a long term management strategy, currently occupied and potentially suitable habitats in Canada need to be thoroughly delineated and assessed for carrying capacity.

In 1984, a North American Management Plan for Trumpeter Swans was developed by various wildlife agencies in the United States and Canada. A major management recommendation of this plan called for the continental population status of Trumpeter Swans be assessed at 5 year intervals. Currently there is a large discrepancy between the winter population estimates for the Interior Canada subpopulation and the total number of birds accounted for on the Canadian breeding areas. Approximately 500 to 600 Trumpeter Swans (25%) using Tri-state wintering habitats are currently unaccounted for by breeding ground population surveys. These birds are believed to originate from breeding habitat in Canada.

The 1990 population and habitat surveys coincided with similar efforts in Alaska, Continental USA, the Yukon, and Northern British Columbia, enabling the updating of habitat use and population estimates for both the Rocky Mountain, Pacific Coast and Interior Populations of Trumpeter Swans. The Alaska portion of this extensive survey has been conducted every five years and Canadian efforts during 1985 and 1990 coincided with the American surveys to improve knowledge on habitat use and population of Trumpeter Swans in North America. These extensive detailed surveys provide a continental perspective on the status of the Trumpeter Swan population and its habitat.

1.1 Objectives

1. Determine the location, distribution and use of Trumpeter Swan breeding habitat in Alberta, Saskatchewan and Northwest Territories(NWT).

2. Document all wetlands used as Trumpeter Swan breeding habitat and determine total flock size within provincial boundaries.

3. Provide information on habitat use and population status to a North American Trumpeter Swan status report and to provincial and local land management authorities.

2.0 METHODS

The five year Trumpeter Swan range - wide survey in western Canada was coordinated by the Canadian Wildlife Service. It was a co-operative effort and involved regional wildlife staff from Alberta Fish and Wildlife Division, Saskatchewan Parks and Renewable Resources, Canadian Parks Service, and the Canadian Wildlife Service. Prior to conducting surveys, participants were provided with information on previous surveys and sightings of Trumpeter Swans within their survey area. Information on survey techniques, data and information required were also provided to obtain some uniformity in methods and type of data collected. Using data from the 1985 range-wide surveys and information on Trumpeter Swan sightings gathered during the last five years, it was determined that ten separate areas of habitat within the Western and Northern Region may have breeding Trumpeter Swans (Figure 1).

Survey routes, covering as much of the known and/or suspected breeding areas, were outlined on 1:250,000 maps. The size and vast expanse of some of the areas especially in the Southern Mackenzie District, NWT did not allow for a systematic survey of the total area. Thus wetlands which have had a history of breeding swans and others proximal to these wetlands were given priority when undertaking aerial surveys. Areas surveyed and dates of the 1990 surveys were as follows:

1. Cardston/Pincher Creek.....August 29
2. Edson/Whitecourt.....September 13
3. Grande Prairie .....September 5
4. Otter/Russell Lakes.....August 22
5. Chinchaga/Whitemud rivers.....August 21
6. Elinor Lake.....July 2
7. Elk Island National Park.....September 11
8. Fawcett Lake.....September 1
9. S.W. Mackenzie District, NWT...Aug.14 - Sept.3
10. Cypress Hills, Saskatchewan....August

Figure 1. Location of 1990 Survey Sites by Flock

Survey routes covered most of the known or suspected breeding wetlands within the above areas. Areas surveyed were similar to the 1985 survey (Shandruk 1986) for Cardston/Pincher Creek, Edson/Whitecourt, Grande Prairie and Otter/Russell lakes. Area size surveyed was increased from 1985 for the S. Mackenzie District NWT (McCormick and Shandruk 1986) and the Chinchaga/Whitemud rivers in Alberta. The major change from the 1985 NWT survey, included a more complete survey of Nahanni National Park and the reduction of the northern extremity of the survey to Wrigley instead of Norman Wells. Minor areas added to the 1990 survey were Elinor Lake, Elk Island National Park (EINP) and the Fawcett Lake area in Alberta. The Cypress Hills in Saskatchewan were not aerial surveyed, as it was determined from (D. Hjertaas, 1990 pers. comm.) that only one breeding pair of Trumpeter Swans occurred in this area in 1989 and that ground surveys were being conducted in 1990.

All censuses in Alberta were conducted using a Cessna 185 or 206 fixed-wing aircraft. In the NWT a 206 fixed-wing aircraft and a Bell 206L helicopter were used to conduct swan breeding habitat surveys. During each survey the fixed-wing aircraft was flown along a designated route at an approximate altitude of 250 m agl and an average speed of 200 km/h. The helicopter surveys were also conducted along designated routes at 150 m agl and 100 km/h. The survey crew whenever possible consisted of a pilot, an observer-navigator, and a second observer. Both observers had maps outlining the survey route and both plotted the location and number of Trumpeter Swans observed. When swans were observed on a wetland, the pilot was asked to circle the wetland at a reduced speed and altitude in order to determine the exact number of swans present and family group composition. Surveys were usually flown during the early morning or late afternoon.

3.0 RESULTS AND DISCUSSION

Survey results were summarized according to the major breeding areas surveyed (Table 1). Observation of a single adult with a cygnet(s) were usually recorded as a breeding pair. Most 1990 survey routes within each specific survey area are illustrated in Shandruk (1986) and McCormick and Shandruk (1986). All specific wetlands on which Trumpeter Swans were observed, their specific location and related information is listed in the Appendix. Limitations in time and assistance precluded the collection of any quantitative habitat information.

Table 1. 1990 Trumpeter Swan Survey Results:

ALBERTA	Pairs with broods	Pairs without broods	Singles with broods	Singles without broods	Flocked adults	Adults subtotal	Total cygnets	Total	Effort: hours
1. Cardston/Pincher Crk	2	3	0	1	0	11	9	20	2
2. Edson/Whitecourt	7	0	0	0	0	14	12	26	2.5
3. Grande Prairie, Alta.	30	37	0	6	93	233	88	321	9
4. Otter/Russell Lakes	1	3	0	2	0	10	3	13	4.2
5. Chinchaga/Whitemud R.	6	8	0	2	3	33	25	58	5.8
6. Elinor Lake	1	0	0	0	6	8	6	14	3
7. Elk Island Park	0	2	1	1	0	6	14	20	1
8. Faucett Lake	1	0	0	0	0	2	3	5	2.5
TOTAL	48	50	1	11	98	306	160	477	30
NORTHWEST TERRITORIES									
9. S.W. Mackenzie District	18	15	0	8	18	92	64	156	15
10. Nahanni Nat. Park	1	8	0	2	5	25	1	26	5
TOTAL	23	19	0	10	23	117	65	182	20
SASKATCHEWAN									
11. Cypress Hills	1	0	0	0	0	2	1	3	0
TOTAL	1	0	0	0	0	2	1	3	0

3.1 Grande Prairie Flock

The number of wetlands surveyed in the Alberta portion of the breeding area was increased to approximately 190 in 1986. Similar survey routes have been followed during subsequent years and thus approximately 190 wetlands were surveyed during the 1990 effort. The British Columbia portion of the flock was also surveyed and this data will be reported in McKelvey and Hawkings (1990).

Sixty-seven pairs of Trumpeter Swans were observed during the survey of the Grande Prairie-Alberta flock (Table 1). Thirty broods totalling 88 cygnets were also censused, and 99 adults and subadults in groups or as singles. A total of 321 Trumpeter Swans were censused during the 1990 survey. These observations do not include the 14 cygnets and 2 adults removed from the flock and transplanted to Elk Island National Park (EINP) during September 8, 1990.

The 1990 survey results showed a small increase from 1985 (Table 2). A decrease in the number of cygnets observed in 1990 can be attributed to the 14 cygnets transplanted to EINP and severe flooding of the nesting areas during June of 1990. The growth rate "R" per year was calculated as 2.4%. Therefore overall, from 1985 to 1990, this flock has not kept pace with the average growth rates of 11% per year observed from 1976 to 1985 McKelvey et al (1988). Harsh environmental conditions on the Henry's Fork of the Snake River in Idaho during the winters of 1986/87 and 1988/89 resulted in significant losses of birds from this flock. Also the transplant of 30 adults and 82 cygnets from this flock to EINP since 1987 may have had an impact on the growth of this flock. Until management efforts to diversify and improve the wintering habitat of this flock are successful, rapid growth may not be desirable.

Table 2. Trumpeter Swan Flock Size Changes 1985 - 1990.

Survey Areas	1985 Paired	1990 Paired	1985 Cygnets	1990 Cygnets	1985 Flocked and Singles	1990 Flocked and Singles	1985 Broods	1990 Broods	1985 Total	1990 Total
1. Cardston/Pincher Crk	6	10	0	9	0	1	0	2	26	20
2. Edson/Whitecourt	14	14	8	12	1	0	2	7	23	26
3. Grande Prairie	102	134	98	88	85	99	25	30	285	321
4. Otter/Russell Lakes	4	8	3	3	4	2	2	1	11	13
5. Chinchaga/Whitemud R.	2	28	3	25	0	5	0	6	5	58
6. Elinor Lake	0	2	0	6	0	6	0	1	0	14
7. Elk Island Park	0	4	0	14	0	1	0	2	0	20
8. Fawcett Lake	0	2	0	3	0	0	0	1	0	5
9. S.W. Mackenzie Dist. NWT	30	66	21	64	10	26	6	18	68	156
10. Nahanni Nat.Park	4	18	3	1	0	7	1	1	7	26
11. Cypress Hills, Sask.	2	2	2	1	2	0	1	1	6	3

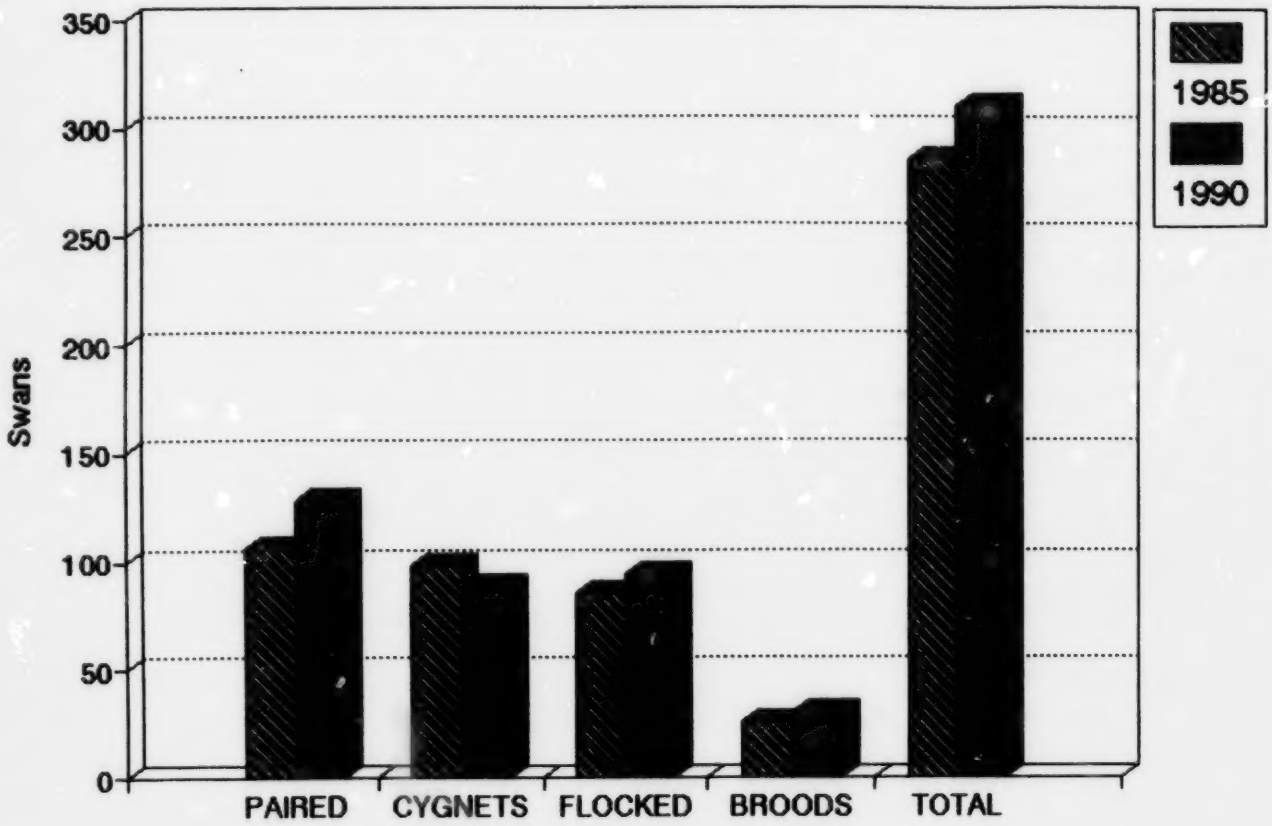

Figure 2. Comparison of Grande Prairie Flock Components, 1985 and 1990

3.2 Southern Mackenzie District Flock NWT

The 1990 survey of the Southern Mackenzie flock including Nahanni National Park Reserve revealed 117 adults (42 pairs) and 65 cygnets in 23 broods whereas the 1985 survey produced 51 adults (17 pairs) and 24 cygnets in 7 broods (Table 2). The total number of Trumpeter Swans observed increased from 75 in 1985 to 182 in 1990. This is an overall flock size increase of 143%. Although the survey area was altered somewhat and a more complete survey was conducted in the Nahanni National Park Reserve there has been definite increases in this flock since 1985 (Figure 3). In 1985 several single swans and/or pairs were observed along the NWT - British Columbia border in the area of Bovie and Celibeta lakes, in 1990 these or adjacent sites were occupied by pairs with broods. Also, considerably more sites were observed with flocked birds in 1990 than in 1985. It is estimated that the number of single and flocked swans doubled from 1985 to 1990.

These results indicate that this flock has experienced considerable growth (R = 19.4) during the last five years. This growth was attained despite the harsh environmental conditions on the Tristate wintering areas and flooding of their breeding habitats in 1989. Limited collaring data indicate that the NWT swans may be more plastic in their choice of wintering habitat and may be better able to cope with adverse environmental conditions than the Grande Prairie flock. Should winter habitat conditions improve in the United States this flock will continue to expand as an abundance of Trumpeter Swan breeding habitats still exist in this area.

3.3 Northern Alberta Satellite Flocks

3.3.1 Otter/Russell Lakes

The 1990 survey area for the Otter/Russell lakes was similar to the area surveyed in 1985. Although there was a slight increase in the total number of swans observed in 1990 the increase was not significant (Figure 4). A change in flock composition was detected between the 1985 and 1990 surveys. In 1990, 4 pairs, 2 singles, and 1 brood of 3 cygnets were observed. In 1985 only 2 pairs, a flock of 4 and 3 cygnets in 2 broods were observed (Table 2). Specific locations of the 1990 observations are listed in the Appendix.

The first detailed survey of this flock was conducted in 1982 (Shandruk 1986) and 14 swans were observed. Although some growth of this flock has occurred it has been determined that it decreased in total size by 13% from 1985. Insufficient numbers of good quality wetlands and poor winter habitat conditions may be the major factors limiting expansion of this flock.

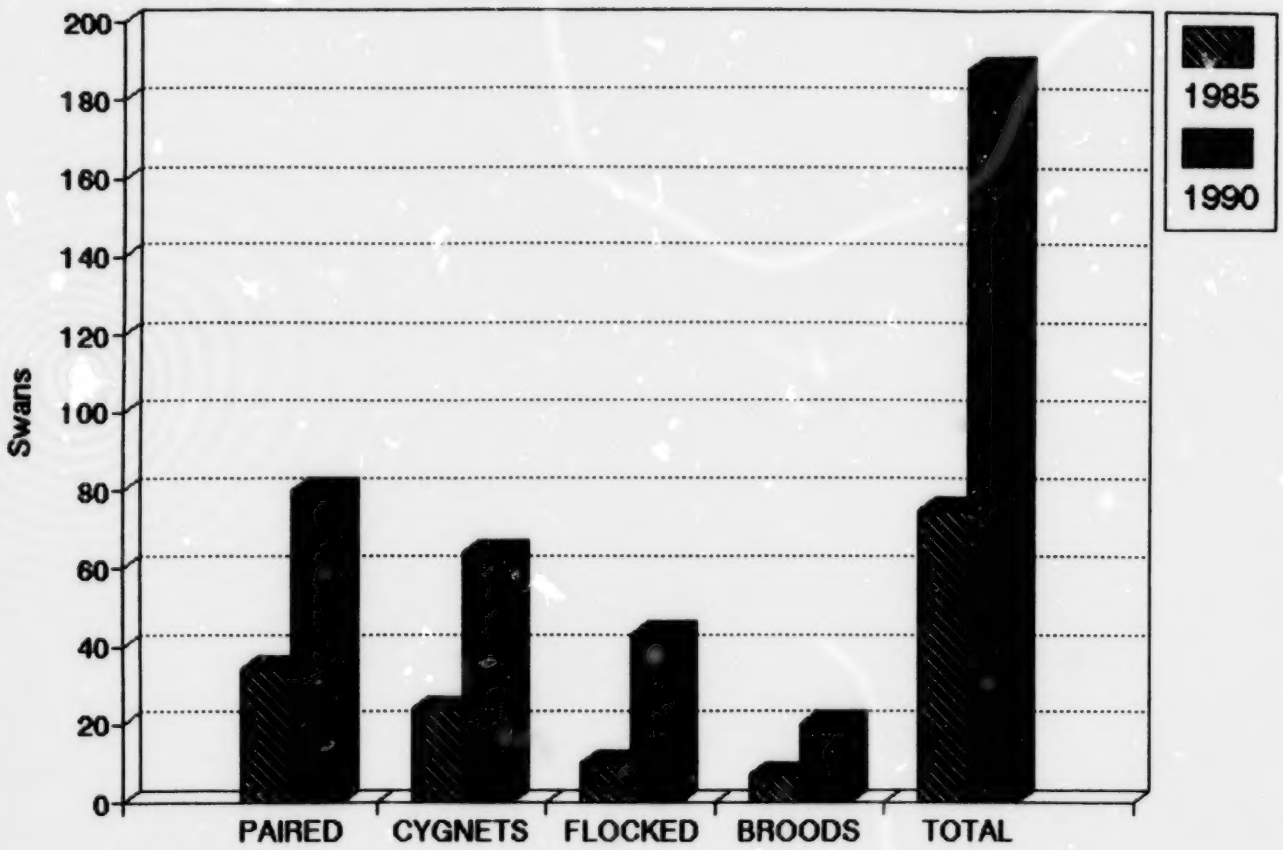

Figure 3. Comparison of NWT Flock Components, 1985 and 1990.

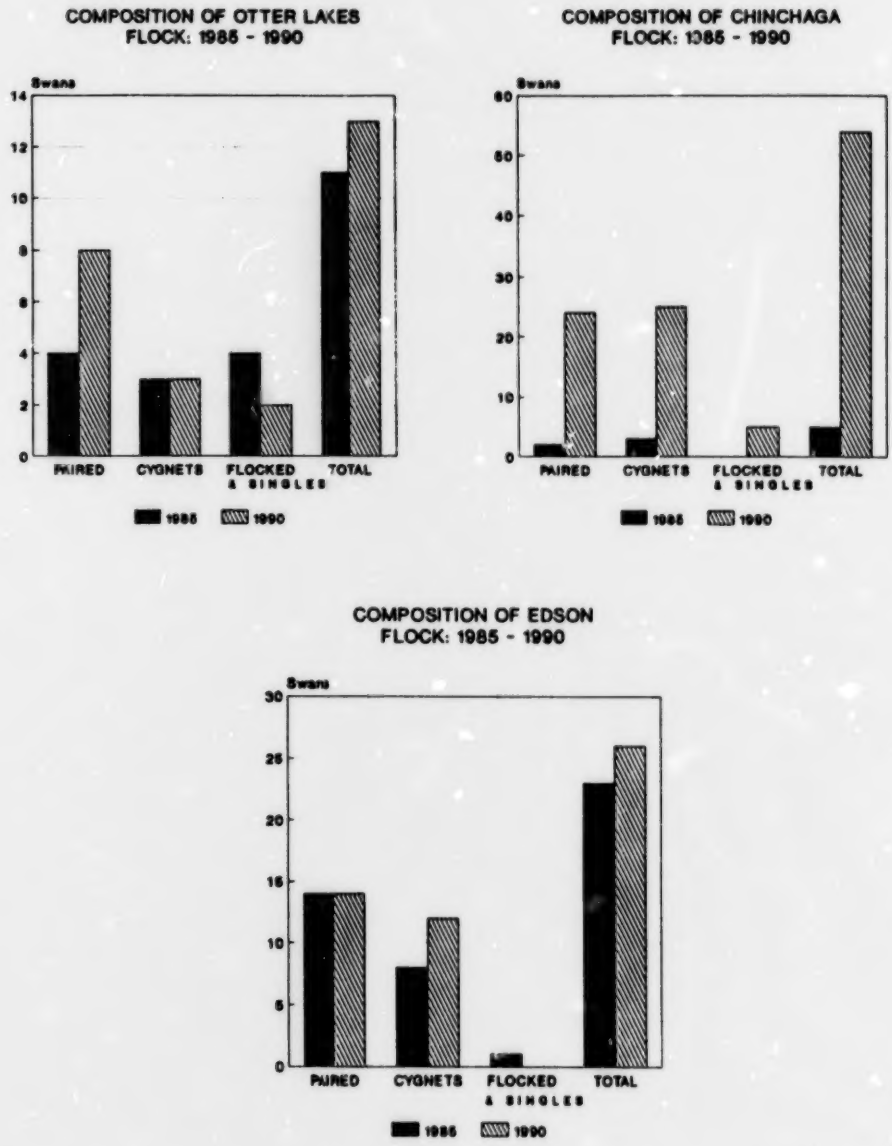

Figure 4. Composition of Alberta Satellite Flocks 1985 and 1990.

3.3.2 Chinchaga/Whitemud Rivers

During the 1990 fall survey of this area 33 adults and 25 cygnets in 6 broods were observed. Although the survey area was enlarged this increase in swan numbers is more than can be accounted for by the larger survey area alone. In 1985, only a pair and 3 cygnets were observed (Table 2). These 1990 observations also exceed those collected by Alberta Fish and Wildlife in 1984 when 13 adults and eight cygnets were observed (G. Holton, 1985 pers. comm.). Although the data is limited and difficult to compare there is evidence of growth and expansion of habitat use by this flock. Whether this flock will continue to grow will depend upon both the extent and availability of suitable breeding and wintering areas.

3.3.3 Edson/Whitecourt

Seven pairs all with broods totalling 12 cygnets were observed during the 1990 survey of the Edson/Whitecourt area. During 1985, 7 pairs of Trumpeter Swans were observed with 2 pairs having broods of 2 each and one of 4 cygnets, respectively and one single.This is an increase for the total flock size from 1985 by 13%. The 1990 survey route flown was very similar to the traditional route flown by Alberta Fish and Wildlife and the Canadian Wildlife Service (Shandruk 1986). Since the results of these surveys have changed little from surveys flown in 1983, 1984, and 1985 it can be assumed that this flock has reached the carrying capacity of its breeding habitat. Therefore the lack of quality wetlands may limit the expansion of the flock in this area.

3.4 Alberta Pioneer Flocks

Three new areas in Alberta (Elinor Lake, Fawcett Lake and EINP) were added to the 1990 survey. Although swans have been observed in both the Elinor and Fawcett lake areas for several years by Alberta Fish and Wildlife and Forest Service, no official aerial surveys were conducted to verify these observations were till 1990. At Elinor Lake, 1 pair with a brood of 6 cygnets and a flock of 6 swans were observed. In the Fawcett Lake area 1 pair and 3 cygnets were observed (Table 1). Both these areas have some but not an extensive amount of breeding habitat to expand into.

At EINP a transplant program has been moving family groups of Trumpeter Swans from Grande Prairie to the Park since 1987. A breeding pair, 1 subadult pair and 1 lone adult now reside in the Park. In addition 2 adults and 14 cygnets were relocated to the Park in September 1990 (Shandruk and Kaye 1990). Funding permitting, transplanting of Trumpeter Swans will continue until 10 breeding pairs are summer residents in and around EINP.

3.5 Pincher Creek/Cardston and Cypress Hills, Saskatchewan

During the 1990 survey of the Pincher Creek/Cardston area, 5 pairs, 1 flocked, and 9 cygnets for a total of 20 Trumpeter Swans were observed. This is a substantial increase from what was observed from the same survey area in 1985 (Table 2). Three pairs of Trumpeter Swans were observed within Waterton Lakes National Park during the 1985 survey. No cygnets were observed, however production of broods has been recorded in this area during previous years (J. Stelfox, and T. Winkler pers. comm.). The habitat quality varies from productive parkland wetlands to deep sterile montane lakes. It is anticipated that with improved wintering habitat conditions this flock will grow and continue to expand into suitable habitat sites.

The Cypress Hills area in Saskatchewan was not aerial surveyed in 1990, since it was determined that Saskatchewan Parks and Renewable Resources personnel had conducted ground surveys of the area in August 1990. D. Djertaas (pers. comm. 1990) indicated that one breeding pair which produced one cygnet was observed. This is a continuation of the downward trend of this flock which consisted of one pair, 2 singles and 2 cygnets in 1985. Unless some management intervention is undertaken, a lack of adequate breeding habitat in this area may eventually result in the demise of this flock.

3.6 1990 Survey Area Population Estimate

In Alberta the 1990 fall survey of the Grande Prairie flock and several satellite flocks has resulted in the documentation of 101 pairs, 115 flocked or singles and 160 cygnets in 49 broods. The 1985 surveys found 71 pairs, 90 flocked or singles and 112 cygnets in 30 broods. Thus the total number of Trumpeter Swans has increased in Alberta from 285 observed in 1985 to 477 in 1990 (Figure 5). Considering the biases of fixed-wing surveys of Trumpeter Swans (Shandruk and McCormick 1989) the Alberta Trumpeter Swan population may be in excess of 150 pairs, 220 cygnets and 185 flocked or singles, for a total Alberta population estimate of approximately 700 Trumpeter Swans.

In the NWT our surveys accounted for 42 pairs, 33 flocked or singles and 65 cygnets in 23 broods. Fixed-wing surveys accounted for 7 pairs, 19 cygnets and 14 flocked or singles, thus if we correct for the potential fixed-wing survey bias the NWT population could number 45 pairs, 76 cygnets and 53 flocked or singles for a total NWT flock size estimate of 220 swans.

Therefore the Alberta and NWT flocks could potentially account for almost 1000 (50%) of the fall flight of the Interior Canada Subpopulation.

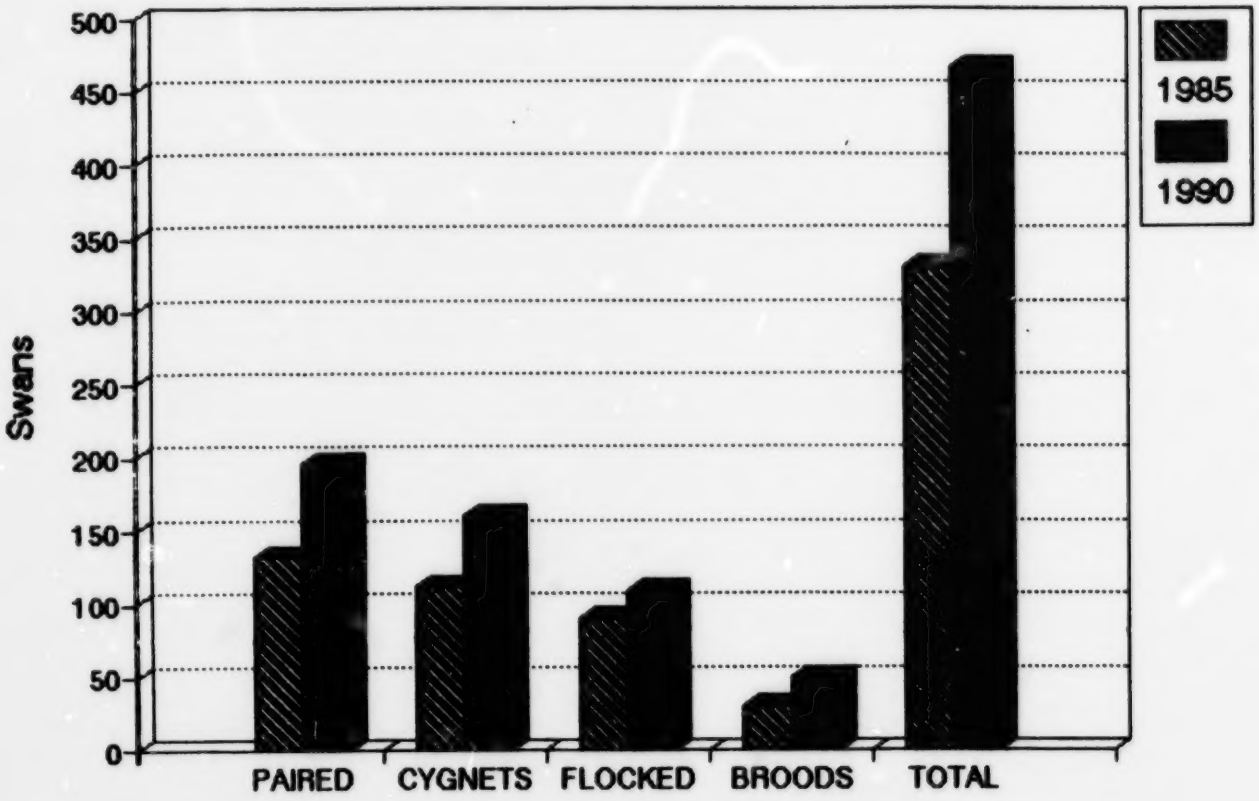

Figure 5. Comparison of Alberta Flock Components, 1985 and 1990.

4.0 RECOMMENDATIONS

Considering the results of these surveys and management priorities for Trumpeter Swans, it is recommended that:

1) annual surveys to monitor status of the Grande Prairie flock, including the B.C. component be continued.
2) mid-summer surveys be initiated on a co-operative basis to better document breeding habitat use and carrying capacity for Trumpeter Swans within the current Canadian breeding range.
3) information on annual population status and habitat use be provided to local land management authorities to ensure continued protection of Trumpeter Swan habitat throughout the region; and
4) there is an immediate need to undertake a marking project in conjunction with relocation efforts on the wintering area, especially on pioneering swans, to improve our knowledge of wintering habitat use by Canadian breeding Trumpeter Swans and possible impacts of the relocations.

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